Parental Intermittent Claudication as Risk Factor for Claudication in Adults

Prushik SG, Farber A, Gona P, et al. Am J Cardiol 2012;109:736-41.

Conclusion: Intermittent claudication (IC) in parents increases the risk of IC in adult offspring, independent of established risk factors.

Summary: A consensus statement from the National Institutes of Health indicates family history is important to patient care because it contributes information to the risk of developing common diseases, including diabetes mellitus, stroke, heart disease, and cancer (Berg AO et al, Ann Intern Med 2009;151:872-7). For example, parental stroke is associated with a threefold increase in the risk of stroke in offspring (Seshaderi S et al, Circulation 2010;121:1304-12). There is, however, little known about familial aggregation of peripheral arterial disease. The Framingham Heart Study provides an opportunity to use prospectively collected data from a large community sample to study IC across two generations. This study tested the hypothesis that parental IC increases risk of IC in adult offspring. The authors evaluated the offspring of participants in the Framingham Heart Study who were aged ≥30 years, free of cardiovascular disease, and had both parents enrolled in the Framingham Heart Study (n = 2970 unique participants, 53% women). The 12-year risk of incidence IC in offspring participants was associated with parental IC and analyzed using pooled proportional hazard regression analysis and adjusting for age, sex, diabetes, smoking, systolic blood pressure, total cholesterol, high-density lipoprotein cholesterol, and antihypertensive and lipid treatment. There were 909 individuals examined in the group with parental IC history and 5,397 in the group with no parental IC history. There were 101 incident IC events during follow-up; 29 in the group with parental IC history and 72 in the group without parental IC history. The age-adjusted and sex-adjusted 12-year cumulative incidence IC rate/1,000 person-years was 5.08 (95% confidence interval [CI], 2.74-7.33) and 2.34 (95% CI, 1.46-3.19) in participants with and without a parental IC history. A parental history of IC increased the risk of incidence IC in offspring (multivariable adjusted hazard ratio, 1.81; 95% CI, 1.14-2.88). Adjustment for the occurrence of cardiovascular disease did not change the hazard ratio.

Comment: The hazard ratio for development of IC in children of patients with IC was independent of established cardiac risk factors, which suggests a genetic component or genetic predisposition to IC. The importance of this potential genetic component in influencing the development of IC cannot truly be determined from these data. There are assuredly environmental and life style factors likely shared within families that could also contribute to the susceptibility to IC. Limitations to this study include that IC was diagnosed by symptoms alone and that the risk factors used for adjustment in the multivariable model were from a single occasion measurement and may not reflect accumulation of lifetime risk factor exposures.

Single Versus Multi-Specialty Operative Teams: Association With Perioperative Mortality After Endovascular Abdominal Aortic Aneurysm Repair

Mazer LM, Chiakof EL, Goodney PP, et al. Am Surg 2012;78:207-12.

Conclusion: Multispecialty participation in endovascular aneurysm repair (EVAR) is associated with higher 30-day mortality compared with single-specialty performance of EVAR.

Summary: EVAR is performed by vascular surgeons, interventional radiologists, interventional cardiologists, general surgeons, cardiovascular surgeons, and combinations of these. There are theoretic concerns of multispecialty participation in a surgical procedure. Potential ambiguity regarding individual physician roles and responsibilities in leadership may contribute to communication breakdown during the procedure. The authors sought to determine the relative frequency of single-specialty vs multispecialty EVAR in 2005 to 2008 using the American College of Surgeons National Surgical Quality Improvement Participant data file. With these data, they explored the influence of multispecialty EVAR on 30-day mortality. EVARs were identified and classified as multispecialty or single-specialty procedures based on Current Procedural Terminology codes. Baseline and procedural characteristics were compared using χ^2 or Fisher exact tests for categoric variables and t tests for continuous variables. Multivariate logistic regression modeling was used to examine the association between multispecialty EVAR and 30-day mortality. They identified 7,269 EVAR procedures; of these 7,086 were performed by a single specialist type and 183 were multispecialty. Frequency of brachial or iliac artery exposure was higher and operative times were longer in multispecialty patients. Patients were otherwise similar in baseline and procedural characteristics. In the multivariate model, multispecialty EVAR was associated with an increased risk of 30-day mortality (odds ratio, 2.35; 95% confidence interval, 1.08-5.11; $P = .031$).

Comment: On the surface, this report by vascular surgeons appears almost as inflammatory as that as of Zafar et al, also abstracted in this edition of the Journal. However, the authors of this article do a much better job of analyzing the weaknesses of the database used and a much better job speculating about the implications of the data. Multispecialty participation may reflect institutional protocols, complexity of the procedure, and relative experience of the individual operators. None of these factors can be addressed well by the National Surgical Quality Improvement Participant use data file.

Survival in Patients With Poorly Compressible Leg Arteries

Arain FA, Ye Z, Bailey KR, et al. J Am Coll Cardiology 2012;59:400-7.

Conclusion: Patients identified by noninvasive vascular testing to have poorly compressible arteries (PCA) in the leg have worse survival than patients with a normal ankle-brachial index (ABI) or those with peripheral arterial disease (PAD).

Summary: The National Health and Nutrition Examination Survey suggests 1.6 million adults aged >40 years in the United States have an ABI >1.4 (Resnick HE et al, Am J Med 2005;118:676-9). Three studies have indicated community-dwelling volunteers with elevated ABIs have survival rates similar to those with PAD (ABI ≤0.9). In this study, the authors sought to compare patients with PCA, who were identified in a noninvasive vascular laboratory, with patients with a normal ABI as well as with patients with PAD. Comparisons were made in prevalence of cardiovascular risk factors, comorbid conditions, and survival. This was a historical cohort study of consecutive patients who underwent outpatient noninvasive lower extremity arterial evaluation at the Mayo Clinic in Rochester, Minnesota, from January 1998 through December 2007. Patients were followed up for a mean duration of 5.8 ± 3.1 years. An ABI of 1.00 to 1.30 was considered normal. PAD was defined as a resting or postexercise ABI of ≤0.90. PCAs were defined as an ABI ≥1.4 or an ankle systolic blood pressure >255 mm Hg or both. Follow-up was for all-cause mortality through September 30, 2009. There were 16,493 individuals (59% men) evaluated with a mean age of 67.8 ± 13.0 years. Of these patients, 29% had a normal ABI, 54% met the definition for PAD, and 17% had PCAs. During a mean follow-up of 5.8 ± 3.1 years 4365 patients (26%) died. At the end of the study period, the percentages alive were 88%, 70%, and 60% in cohorts with a normal ABI, PAD, and PCA, respectively. After adjustment for age, sex, comorbid conditions, cardiovascular risk factors, and medications, the hazard ratios of death associated with PCA were 2.0 (95% confidence interval, 1.8-2.2) and 1.3 (95% confidence interval, 1.2-1.4) compared with the normal ABI and PAD groups, respectively.

Comment: There were 2,781 patients with poorly compressible arteries in this series, the largest cohort of such patients to be studied and followed up. Nevertheless, the study cohort was almost entirely non-Hispanic white, and therefore, it may be difficult to generalize the findings to other racial and ethnic groups. It is unclear whether PCAs are a marker of increased risk or directly contribute to increased mortality. Greater arterial stiffness in patients with PCAs may lead to higher blood pressure and subsequently greater left ventricular mass. Serum N-terminal pro-B-type natriuretic peptide levels are higher in patients with PCA than in those with normal ABI and PAD (Jouni H et al, Atheroscler Thromb Vasc Biol 2011;31:197-202), suggesting a greater underlying component of heart disease in patients with PCAs. Whether PCAs are causing heart disease or are a "fellow traveler" of advanced atherosclerosis is unknown.

Thoracic or Thoracoabdominal Approaches to Endovascular Device Removal and Open Aortic Repair

LeMaire SA, Green SY, Kim JH, et al. Ann Thorac Surg 2012;93:726-33.

Conclusion: Open surgical repair for failed endovascular aortic procedures performed through thoracic or thoracoabdominal approaches is successful in most patients, provided the device is not infected.

Summary: It is now quite evident, unfortunately, that devices placed for endovascular repair of aortic aneurysms must occasionally be removed with open surgical techniques. This may be due to aneurysm expansion secondary to endoleak, aortic rupture, and on occasion, infection of the stent graft. A number of case series describe removal of abdominal devices through abdominal incisions. Although the frequency of open conversion is difficult to determine, it does appear with placement of more devices and placement of devices outside the instructions for use provided by the manufacturer, that open removal of endovascular aortic devices is becoming more frequent. The literature suggests that rates of late open conversion range from 2.2% to 6.2% for thoracic endovascular aneurysm repair and from 0.9% to 2.4% for EVAR.

The authors report a relatively large series of 35 patients undergoing repair via a thoracic or thoracoabdominal approach for a failed endovascular device. Open aortic repair was preformed through thoracotomy (n = 7) or thoracoabdominal incision (n = 28) from 0.5 to 48 months after the original endovascular thoracic (n = 27) or abdominal (n = 8) aortic procedure. Open repair was indicated for expanding aneurysm in 23 patients, infection of the device in eight, fistula in five, pseudoaneurysm in two, aneurysm rupture in two, and restenosis in one. A device was partially removed in nine patients and completely removed in 26. The authors preformed thoracic aortic repair in 10 patients, thoracoabdominal aortic repair in 24, and juxtarenal abdominal aortic repair in one. There were two in-hospital deaths (6%). Both deaths occurred in patients with endovascular device infection.

There were also eight late deaths. One-year survival was 83% ± 7%. Among patients with infected endovascular devices, three experienced major late complications (persistent infection, pseudoaneurysm, and recurrent fistula), and two of these patients died.

Comment: This is a large series of complex procedures performed for failure of endovascular abdominal or thoracic aortic devices. Case series of open removal of endovascular devices seem to be appearing more frequently as more of these devices are implanted. It is notable that the devices in 71% of the patients in this series were implanted for off-label indications. Sixty percent of the patients had been treated for aortic dissection. It also should be noted that if the device is not infected, the patients can do well with open removal. However, as whole, patients with infected devices and those with devices placed for control of fistula have a poor prognosis.

Usefulness of Pre-Operative Copeptin Concentrations to Predict Post-Operative Outcome After Major Vascular Surgery

Jarai R, Mahla E, Perkmann T, et al. Am J Cardiol 2011;108:1188-95.

Conclusion: Copeptin is a new biomarker that potentially improves prediction of perioperative and postoperative outcomes in vascular surgery patients.

Summary: The revised cardiac risk index, the so-called Lee index, is used widely to determine preoperative risk of surgical patients (Lee TH et al, Circulation 1999;100:1043-49). Arginine vasopressin (AVP), an antidiuretic hormone, is important in the regulation of cardiovascular homeostasis. It also affects platelet aggregation and release of von Willebrand factor (Katan M et al, Crit Care 2008;12:117). Many factors play a role in perioperative myocardial infarction, including hypertension, platelet aggregation, fibrinolytic activity, and hypercoagulability. Some of these are influenced by AVP. The authors postulate enhanced AVP secretion before surgery could potentially make patients susceptible to perioperative myocardial events; however, for a variety of reasons, AVP itself is unsuitable as a biomarker for routine clinical practice. The C-terminal fragment of the provasopressin peptide, copeptin, is secreted in equimolar amounts with AVP. Copeptin can be reliably determined with a chemiluminescence assay (Morgenthaler NG et al, Clin Chem 2006;52:112-9). The purpose of this report was to determine whether copeptin levels the day before elective vascular surgery identified high-risk patients. There were 189 consecutive patients who underwent major vascular surgery. Infrainguinal reconstructions accounted for 58.6%, abdominal aortic aneurysm surgery for 23.7%, and carotid endarterectomy for 17.7%. In-hospital and 2-year major cardiac adverse event rates (cardiac death, nonfatal myocardial infarction, emergency coronary revascularization) were monitored. Forty patients (20.2%) reached the primary end point. Most events occurred during the index hospital stay, 45%. By univariate analysis, increasing concentrations of copeptin as a continuous variable were significant determinants of outcome (hazard ratio [HR], 1.012; $P = .005$) and as a dichotomized variable using the recommended cutoff of 14.0 pmol/L (HR, 4.116; $P < .001$). Patients at low estimated risk according to N-terminal pro-B-type natriuretic peptide (NT-pro-BNP) levels were at a significantly higher risk for worse outcomes with higher copeptin levels (HR, 5.983; $P = .002$). Multivariate Cox regression analysis demonstrated copeptin concentrations >14 pmol/L were independent predictors of outcome (HR, 2.842; $P = .002$). This was in addition to type of surgery, history of myocardial infarction, and elevations of cardiac troponin T and NT-pro-BNP levels. Higher copeptin levels were additive to the Lee index (>14 pmol/L; HR, 4.059; 95% confidence interval, 2.18-7.57; $P < .001$) and to the Eagle score (HR, 3.26; 95% confidence interval, 1.72-6.17; $P < .001$) for estimating postoperative outcomes.

Comment: There is the possibility, because of the small number of patients in this study, the authors actually underestimated the association of copeptin concentrations with cardiac events after major vascular surgery. It follows they may also underestimate the additional predictive value of copeptin concentrations to more established risk factor assessment, such as the Lee index, NT-pro-BNP, and Eagle criteria. In addition, patients entered this study between 2002 and 2003, and techniques of anesthesia and vascular surgery have changed significantly since then. The authors' results, therefore, while interesting, need confirmation in a larger more contemporary population of vascular surgical patients.